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WADD TECHNICAL NOTE 61-44

Maneuver Load Data From C-130 Aircraft

Lawrence Phillips

STRUCTURES BRANCH
FLIGHT DYNAMICS LABORATORY

MARCH 1961

WRIGHT AIR DEVELOPMENT DIVISION

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March 1961

Project No. 1367
Task No. 13637

WRIGHT AIR DEVELOPMENT DIVISION
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

FOREWORD

This report was prepared in the Structural Loads Section, Structures Branch, Flight Dynamics Laboratory, Aeromechanics Division, Directorate of Advanced Systems Technology, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio. Data acquisition and processing were accomplished by the University of Dayton Research Institute (UDRI), Dayton, Ohio, under Air Force Contract AF 33(616)-5406 (follow-on 6719), Research and Development Project 1367, "Structural Design Criteria," Task 13637, "Collection and Statistical Analysis of Structural Flight Data." Mr. Lawrence Phillips of the Flight Dynamics Laboratory was project engineer in charge of the basic research and development work which were performed by the UDRI.

The data upon which this report is based were collected on C-130A and B aircraft while performing normal missions. These aircraft were based at Sewart Air Force Base from June 1959 to June 1960.

Acknowledgement is made to Mr. James Gallico and Mr. John Nash of UDRI for the assistance provided in the preparation of the data and the report.

ABSTRACT

This report presents structural flight load data from C-130A and B aircraft performing normal operations and analyses of the data. This information is intended for use in determining design criteria for future flight vehicles and in estimating the effect of these missions on a structure of this type in terms of structural fatigue and estimated life.

PUBLICATION REVIEW

This report has been reviewed and is approved.

FOR THE COMMANDER:

William C. Nielsen

WILLIAM C. NIELSEN
Colonel, USAF
Chief, Flight Dynamics Laboratory

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INTRODUCTION

A flight load recording program on C-130 aircraft assigned to the Tactical Air Command was initiated by WADD as part of the continuous effort to collect structural loads data which are used as a basis for establishing and refining structural design criteria.

The flight loads data presented in this report were collected during normal operations of C-130A and B aircraft stationed at Sewart Air Force Base, Tennessee. The useful data collected on the C-130A and B aircraft from June 1959 to June 1960 totaled, respectively, 528.3 and 548.7 hours.

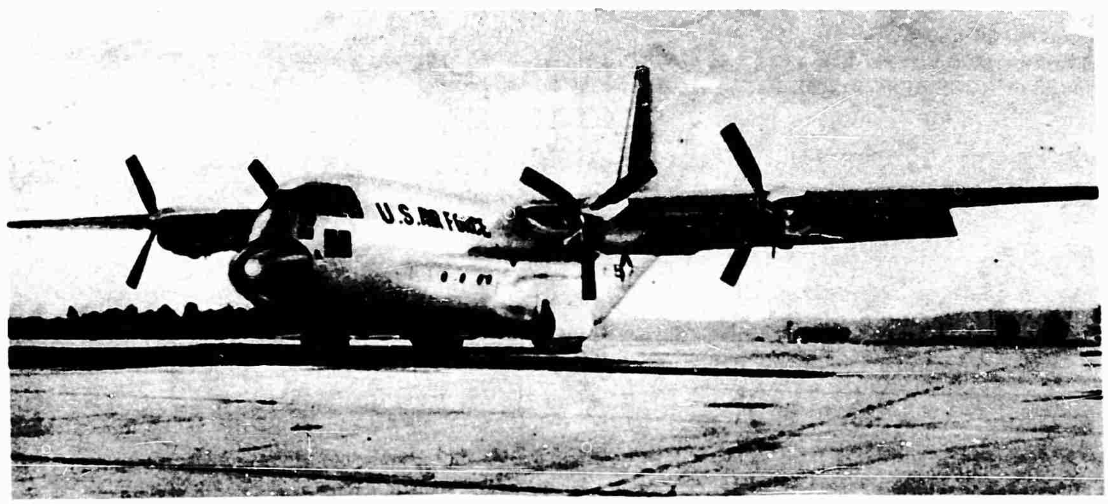

Figure 1. C-130 Aircraft

SECTION II

DISCUSSION

A. Data Recording System

The Hathaway Flight Analyzers were installed in each of fifteen aircraft. The Flight Analyzer is an instrument which records a number of variable quantities during the flight of an aircraft; these are: normal acceleration, airspeed, and altitude, which are recorded simultaneously versus time on a single chart. Recording is done on a special chart with dimensions of 9 inches wide by 50 feet long and is driven at a speed of 120 inches per hour. The traces are impressed on the chart by electrical discharges from styli which are actuated by the effects of

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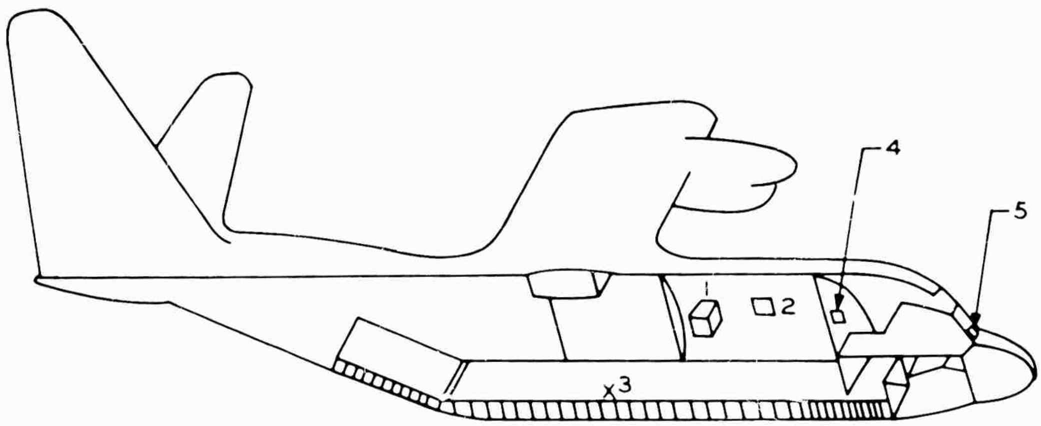
sensing elements. This instrument has a frequency response flat to approximately 5 cps.



1. HATHAWAY FLIGHT ANALYZER
2. CARGO OUTLET BOX & CIRCUIT BREAKER
3. APPROXIMATE CENTER OF GRAVITY
4. APPROXIMATE POINT OF STATIC LINE CONNECTION
5. APPROXIMATE POINT OF PITOT LINE CONNECTION

Figure 2. Sectional Drawing of the C-130 Aircraft Depicting the Positioning of the Hathaway Flight Analyzer, Components, and the Approximate Center of Gravity

B. Data Processing

Desired information was extracted from the Flight Analyzer charts either by manual graphite transcriptions to a Mark Sense card or by employing the semiautomatic Benson-Lehner reader. Subsequently, as the Mark Sense cards were passed through the IBM 519, the graphite markings sensitized a device for the punching of holes representing the magnitudes of the original transcriptions. The Benson-Lehner reader converted the analog form of the trace deflections into digital information, transcribing the extracted and modified data into paper tape and/or IBM cards. Then the punched cards and/or tape were fed into a digital electronic computer, the Burroughs 205, for the performance of all computational tasks. Other equipment employed in the data processing included the IBM 101 Statistical Sorter and the IBM 407 Tabulator.

Deviations of the normal load factor trace which departed from either of two threshold levels and endured for two seconds or more before returning to the threshold level were interpreted as being attributed to the maneuvering effect. All other deviations were attributed to gusts and were not read.

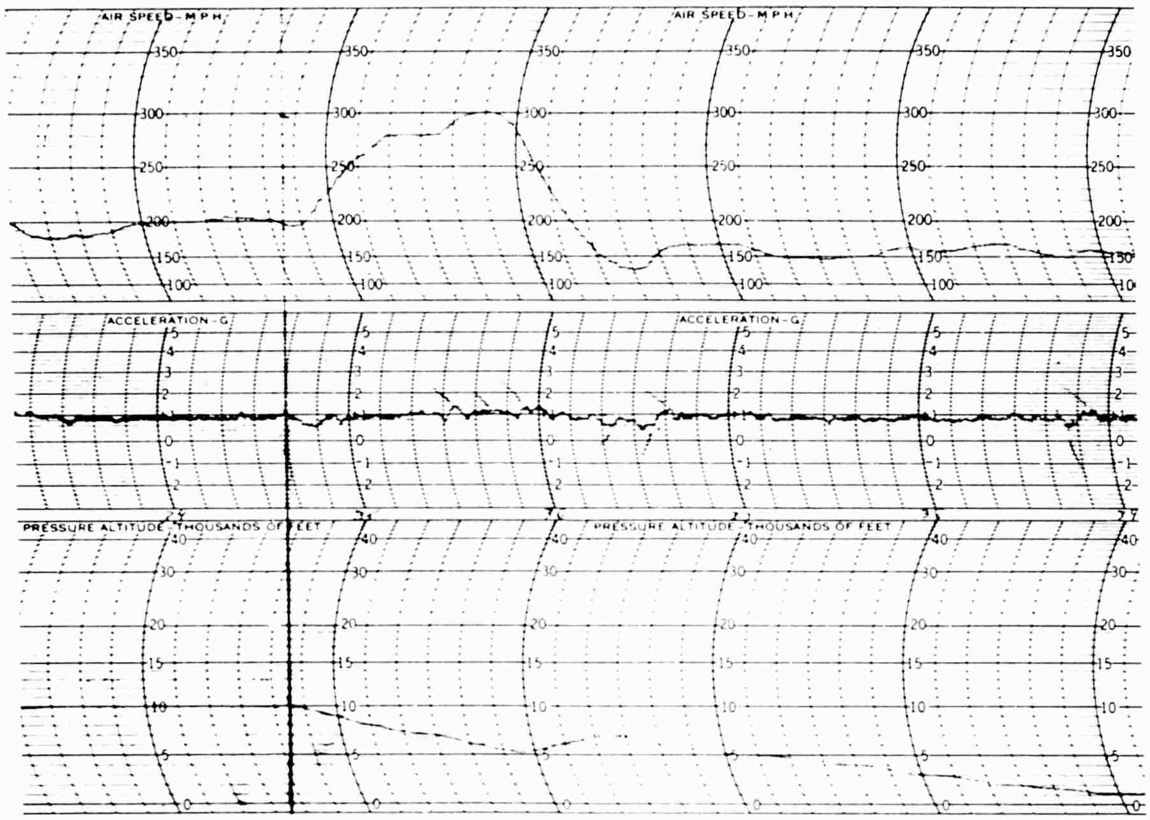


Figure 3. Sample of a Portion of the Hathaway Flight Analyzer Chart

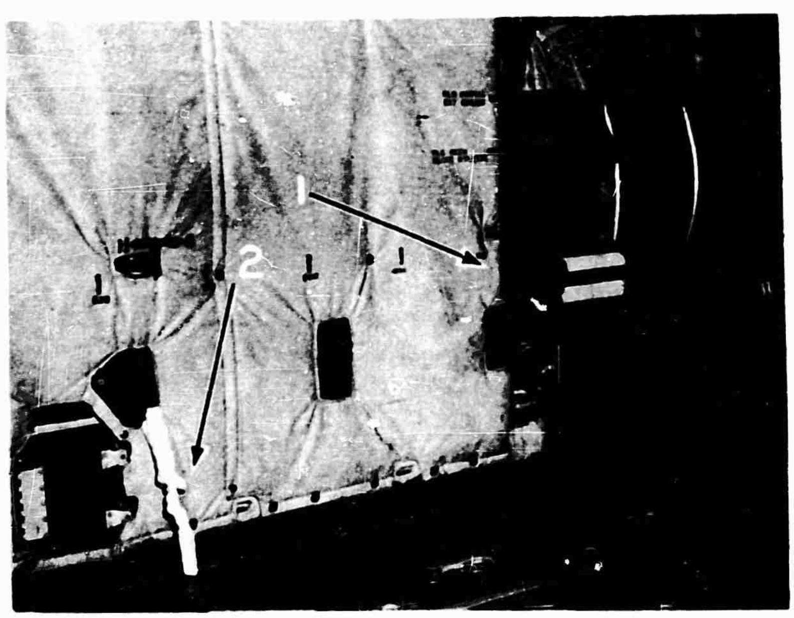


Figure 4. View of the Hathaway Flight Analyzer Installation (1) and the Approximate Center of Gravity Position (2)

Positive and negative threshold levels were established, respectively, at 1.2 and 0.8 g's. Only the maxima of such deviations were read.

Data recording and data processing results are within ± 7% of the actual values.

C. Methods of Analysis

Probability curves were constructed using the cumulative frequency of occurrence of a load factor in excess of a given load factor experienced as a function of time, i. e., the number of hours of flight time necessary before one such load factor is expected to occur. These values of flight time were plotted on semi-log graph paper against the given load factor, and a curve was drawn through the points.

SECTION III

DATA PRESENTATION

The recorded maneuver load factors of the C-130A and B are plotted on design V-n diagrams in Figures 5 and 6, respectively. These diagrams show that the instrumented aircraft did not exceed the limits of the design positive and negative load factors during the 1077 hours flown in this recording program. To illustrate further the operational comparisons of the two models of C-130 aircraft, histograms showing the percentage of flight time spent at selected airspeed and altitude ranges are presented in Figures 8 and 9. The histograms show that the C-130B, which was designed for optimum cruise conditions, spent a greater percentage of time at higher airspeed (250 to 400 knots) and altitude (20,000 to 35,000 feet) ranges than did the C-130A, which was designed for optimum performance characteristics. Probability curves showing the rate of occurrence of maneuver load factors are plotted in Figure 7. This figure shows that C-130B aircraft were subjected to a greater frequency of occurrence of load factors in the range of 1.5 to 2.0 g's than were the C-130A aircraft.

Tabulations of the distribution of maneuver load factors by equivalent airspeed in selected altitude and gross weight ranges are presented in Tables 1 through 4 for the C-130A aircraft and in Tables 5 through 8 for the C-130B aircraft. In Tables 1 through 8 the airspeed values given are the mid-points of 25-knot intervals, i. e., 187 knots represents the mid-point of the range of 175 to 199 knots. Also, the load factor values given represent the mid-point of 1-g ranges, i. e., 1.5 g represents the mid-point of the range of 1.45 to 1.54 g's. The exceptions to this are the threshold values, .8 and 1.2 g's, which represent the beginning points of the ranges of .8 to .75 g's and 1.2 to 1.24 g's.

SECTION IV

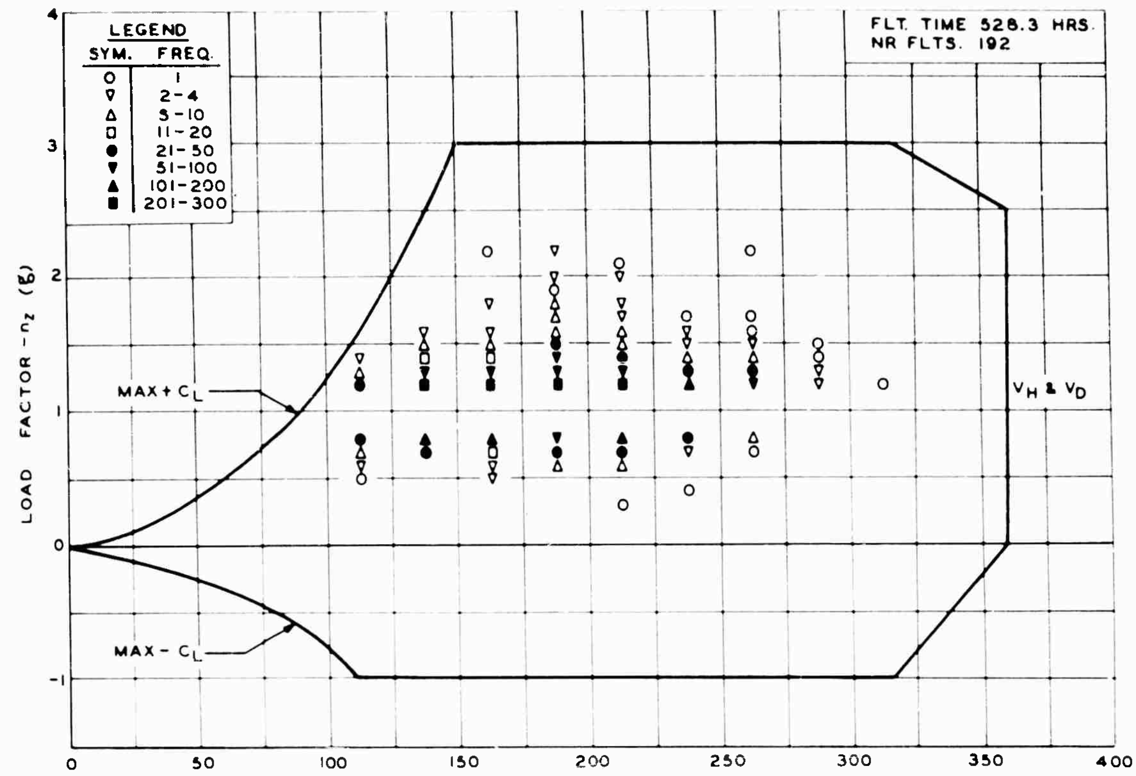
CONCLUSIONS

1. The instrumented aircraft did not exceed the limit design load factors during the 1077 hours flown during this recording program.

2. The C-130B aircraft spent a greater percentage of time at the higher airspeed (250 to 400 knots) and altitude (20,000 to 35,000 feet) ranges than did the C-130A aircraft.

3. The C-130B aircraft were subjected to a greater frequency of occurrence of load factors in the range of 1.5 to 2.0 g's than were the C-130A aircraft.

4. The C-130 data contained herein are considered adequate for performing a fatigue analysis.



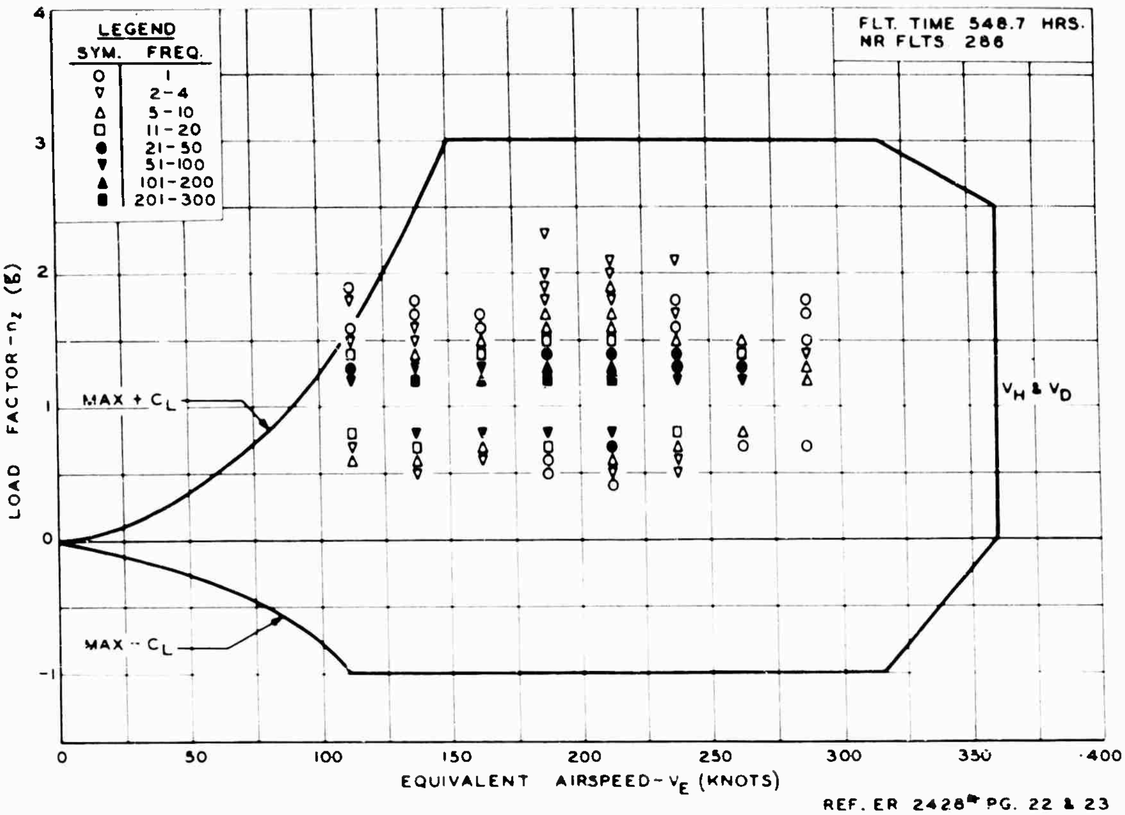
REF. ER 2428* PG. 22 & 23
SEA LEVEL - 70,924 LBS.

LOAD FACTOR - n_z (G)

V_E KNOTS	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	TOTAL
112			1	3	5	25	27	8	2										69
137					21	113	269	84	20	5	2								514
162			3	3	17	117	223	72	14	7	3		2				1		462
187				8	27	100	297	95	53	23	8	5	6	1	2		2		625
212	1			7	36	152	292	83	25	7	7	3	4		2	1			620
237		1			4	25	139	43	5	2	3	1							223
262					1	7	55	23	8	3	1	1					1		98
287							4	3	1	1									9
312							1												1
TOTAL	1	1	4	19	111	539	1307	409	128	48	24	10	12	1	4	1	4		2621

Figure 5. C-130A V-n Diagram and Tabulation of Maneuvers

*Published by Lockheed Aircraft Corp.



REF. ER 2428* PG. 22 & 23
SEA LEVEL − 70,924 LBS.

LOAD FACTOR − n_z (G)

V_E KNOTS	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	TOTAL
112				5	3	13	79	27	14	3	1		3	1					149
137			2	5	18	57	204	69	9	2	3	1	1						371
162				4	6	71	182	57	15	8	1	1							345
187			1	1	12	78	208	101	35	14	10	9	3	2	2			2	478
212		1	2	8	45	75	227	114	40	14	10	10	4	5	4	2			559
237			2	2	5	20	82	33	21	7	1	2	1			4			180
262					1	6	78	27	14	6									132
287					1		10	8	3	1		1	1						25
TOTAL		1	7	23	91	320	1070	438	151	55	28	24	13	8	8	6		2	2239

Figure 6. C-130B V-n Diagram and Tabulation of Maneuvers

*Published by Lockheed Aircraft Corp.

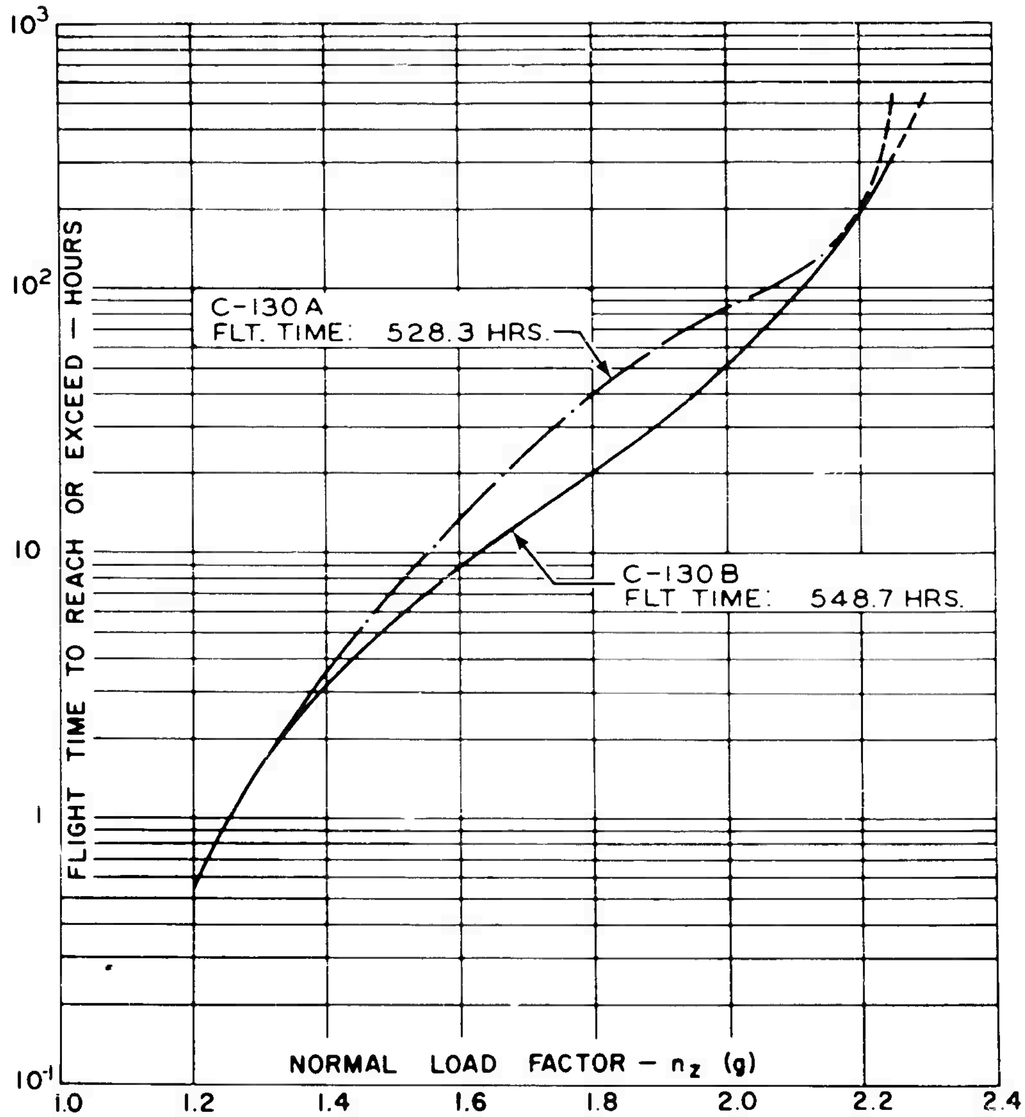
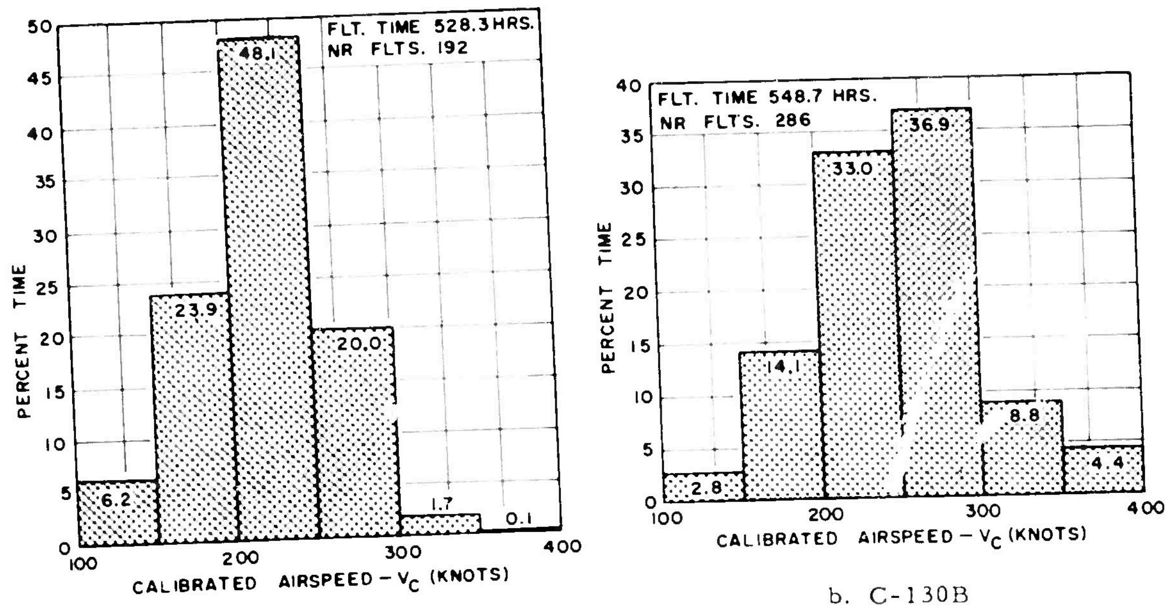


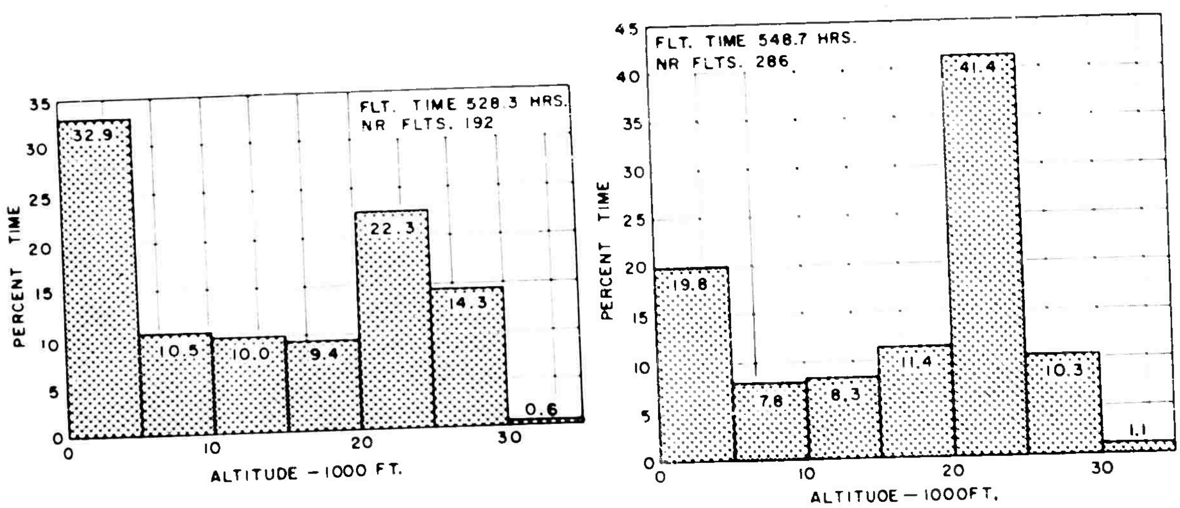
Figure 7. C-130 Probability Curves - Maneuver Loads



a. C-130A

b. C-130B

Figure 8. Percent of Total Flight Time Spent at Selected Airspeed Ranges; a. C-130A, b. C-130B



a. C-130A

b. C-130B

Figure 9. Percent of Total Flight Time Spent at Selected Altitude Ranges; a. C-130A, b. C-130B

Table 1

Distribution of C-130A Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 0 to 5,000 Feet

65,000 to 120,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				2	2	12	14	5	2										42
137					12	97	229	11	15	3	1								428
162			3	2	11	12	172	62	12	7	1		2						346
187				6	20	64	274	66	46	20	1	3	6	1	2		2		419
212				7	26	108	180	59	17	4	6	3	4		2	1			419
237		1			3	9	40	22	2	3	1								92
262					1		10	6	1	2	1	1					1		23
287							1	1	1										3
312																			
Total		1	3	17	79	362	535	292	96	38	19	9	12	1	4	2	3		[illegible]

65,000 to 80,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112							4												5
137					3	25	52	15	1										61
162			1		1	9	33	15	2				2						63
187						6	29	9	6								1		52
212				1	1		24	11		1	1					1			49
237							2	2											4
262																			
287																			
312																			
Total			1	2	5	41	114	51	9	1			2			1	1		254

80,000 to 95,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				2	2	8	11	2	1										27
137					2	24	229	43	22	3	1								332
162			2	2	1	47	126	2	1	3	1								222
187				4	15	47	213	46	29	10	5	4	2		2		2		384
212				6	22	22	221	62	11	2	5	2	5		2				283
237					1	6	15	6	2		2								63
262					1		3	1	1	2		1							12
287								1	1										[illegible]
312																			
Total		2	1	14	55	234	523	142	61	23	13	8	6		4		1		1141

95,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112						1	1	3											10
137					1	23	41	11	4										64
162			1		2	11	22	13	1	1									55
187				1	4	11	30	10	11	1	2	1	1	1					81
212					3	32	33	7	6	1	1								94
237					1	3	13	3		1									21
262							1	3			2						1		6
287							1												1
312																			
Total			1	1	11	92	154	52	25	6	4	1	1	1			1		340

110,000 to 120,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137					1														1
162					1	5	11	5		1									19
187							7	2	1	1	1								12
212								1											1
237							1	1											2
262																			
287																			
312																			
Total					2	1	19	7	1	2	1								35

Table 2

Distribution of C-130A Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 5,000 to 15,000 Feet

65,000 to 120,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112			1	1	2	12	8												24
137					6	10	23	4			1								44
162				1	3	17	21	5	1										48
187					3	10	41	12	2	3	1								72
212					2	10	37	6	4	3									62
237					2	11	54	14	1		1	1							84
262						3	34	17	3	1									58
287							1	4		1									6
312																			
Total			1	2	18	73	219	62	11	8	3	1							398

65,000 to 80,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112			1			3	4												8
137					1		9												[illegible]
162						1	1												2
187						1	6	1											8
212						2	2	1	1										6
237						1	6	3											10
262							5	3											8
287								2											2
312																			
Total			1			8	33		1										54

80,000 to 95,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				1	2	4	1												8
137					4	7	14	3			1								32
162				1	3	14	19	4	1										42
187					3	[illegible]	33	11	2	3	1								64
212					2		16	5	3	1									32
237					2	10	43	11	1		1	1							69
262						3	24	14	2	1									44
287							1	2		1									4
312																			
Total				2	15	56	171	50	9	6	3	1							314

95,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112						5	3												8
137					1			1											2
162						2	1	1											4
187																			
212						1	1			1									3
237							2												2
262							4		1										5
287																			
312																			
Total					1	8	11	2	1	1									24

110,000 to 120,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137						1													1
162																			
187																			
212										1									1
237							3												3
262							1												1
287																			
312																			
Total						1	4			1									6

Table 3

Distribution of C-130A Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 15,000 to 25,000 Feet

65,000 to 120,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g)																		Total
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	
112					1	1		1											3
137					2	4	11	8	4										29
162					2	25	26	5	1								1		60
187					3	22	57	14	4										100
212	1				3	25	58	11	3		1								102
237						4	32	4	2		1								43
262						4	9		2										15
287																			
312							1												1
Total	1				11	85	188	43	16		2						1		353

65,000 to 80,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g)																		Total
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	
112																			
137						1	6	1	1										9
162					1	2	2												5
187						4	6	1											11
212						2	11	1			1								15
237						1													8
262																			
287																			
312																			
Total					1	10	32	3	1		1								48

80,000 to 95,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g)																		Total
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	
112					1	1													2
137					4	3	4	6	2										[illegible]
162					[illegible]	21	22	5	1								1		53
187					2	17	43	1	4										[illegible]
212	1				1	23	13	15	6										82
237						5	8	1	2		1								39
262						3	3		1										41
287																			
312							1												1
Total	1				3	[illegible]	[illegible]	[illegible]	[illegible]										[illegible]

95,000 to 110,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g)																		Total
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	
112																			
137								1											1
162							2												2
187					1	1	7	2											11
212							2	1	1										4
237							4	1											5
262						1													1
287																			
312																			
Total					1	2	15	5	1										24

110,000 to 120,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g)																		Total
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	
112																			
137																			
162																			
187							1												1
212																			
237																			
262																			
287																			
312																			
Total							1												1

Table 4

Distribution of C-130A Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 25,000 to 35,000 Feet

65,000 to 110,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g) 0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137					1	2	6	1	1	2									13
162					1	3	4												8
187					1	4	25	1	1										34
212					3	9	23	1	1										37
237						1	2	3											6
262							2												2
287																			
312																			
Total					6	19	62	8	3	2									100

65,000 to 80,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g) 0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137								1	1										2
162							1												1
187					1	1													2
212						3	2												5
237																			
262																			
287																			
312																			
Total					1	4	4	1	1										11

80,000 to 95,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g) 0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137					1	2	6			2									11
162					1	3	3												7
187						3	25	3											31
212					3	5	17	1	1										27
237						1	2	3											6
262							2												2
287																			
312																			
Total					5	14	55	7	1	2									84

95,000 to 110,000 lbs.

V_e (Knots)	LOAD FACTOR n_z (g) 0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.6	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137																			
162																			
187									1										1
212						1	1												4
237																			
262																			
287																			
312																			
Total						1	1		1										5

Table 5

Distribution of C-130B Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 0 to 5,000 Feet

75,000 to 130,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				1		9	57	19	11	2	1		3	1					106
137			2	3	13	43	186	63	8	2	3	1	1						331
162				4	4	45	139	39	12	5		1							248
187				1	7	43	141	74	26	13	10	8	5	2	2			2	340
212		1	2	6	38	53	156	90	33	13	9	10	4	5	3	2			425
237			2	2	5	7	16	19	12	5	1	2	1			1			95
262					1	2	9	7	4	2									25
287							4	2	1				1						8
312																			
Total		1	6	19	68	224	727	321	109	42	24	22	13	8	5	5		2	1578

75,000 to 80,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137							3	2			1								6
162						2	2												4
187							3	1	1										5
212					2		6	3											11
237									1										1
262																			
287																			
312																			
Total					2	2	14	6	2		1								26

80,000 to 95,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				2		2	15	3											23
137				1	1	18	52	22											86
162				1	2	15	32	3	1										58
187						9	23	12	2	1	2								51
212				5	13	15	23	13	3	3	2		1						72
237			2		2		11	4		2									21
262						1													2
287																			
312																			
Total			2	10	21	45	154	61	14	6	4								316

95,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112						5	23	7	6	1			1						43
137			2		4	36	126	33	1	2	1								206
162				3	2	26	95	25	9	1									161
187				1	6	24	41	44	15	10	6	5	2	1	2			2	159
212		1	2		22	36	34	62	26	3	6	10	3	4	3	2			280
237				2	2	7	19	13	9	3	1	2	1			1			62
262					1	1	7	6	4	2									21
287							4	2	1				1						9
312																			
Total		1	4	6	42	135	451	192	[illegible]	30	14	17	8	5	5	5		2	994

110,000 to 130,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				1		2	19	9	4	1	1		2	1					40
137				2	1	1	7	8	1		1	1	1						23
162						6	9	5		2		1							23
187					1	17	34	19	5	2	2	3	1	1					85
212					2	6	33	12	4	1	1			1					60
237					1		6	2	2										11
262																			
287																			
312																			
Total				3	5	32	108	55	16	6	5	5	4	3					242

Table 6

Distribution of C-130B Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 5,000 to 15,000 Feet

75,000 to 130,000 lbs.

V_e (Knots)	LOAD FACTOR - n_z (g)																		
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				2	1	3	15	4	2	1									26
137				1	2	2	8	2											15
162					1	17	14	3		2									37
187			1			12	26	7	3	1									50
212					3	4	22	10	2		1				1				43
237						9	29	8	4	1									51
262						3	42	17	9	2									80
287					1		4	6		1		1							13
312																			
Total			1	3	10	50	167	57	20	4	1	1			1				319

75,000 to 80,000 lbs.

V_e (Knots)	LOAD FACTOR - n_z (g)																		
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137																			
162						3	3	1											7
187						1													1
212						2													2
237								1											1
262								1											1
287																			
312																			
Total						6	1	1											12

80,000 to 95,000 lbs.

V_e (Knots)	LOAD FACTOR - n_z (g)																		
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112							1	1											2
137							4	1											5
162						1													1
187							5		1										6
212					4		3	4											11
237							6	2											8
262						2	17	3	2										25
287								2											3
312																			
Total					4	2	36	16	3										61

95,000 to 110,000 lbs.

V_e (Knots)	LOAD FACTOR - n_z (g)																		
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112				2	1	3	14	3	2	1									26
137				1	2	2	4	1											10
162					1	12	9	2		2									26
187			1			10	17	7	2	1									38
212					1	1	14	3	2		1				1				23
237						9	20	5	3	1									38
262						2	26	11	7	2									48
287					1		1	3		1		1							7
312																			
Total			1	3	6	37	105	35	16	8	1	1			1				216

110,000 to 130,000 lbs.

V_e (Knots)	LOAD FACTOR - n_z (g)																		
	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137																			
162						1	2												3
187						1	4												5
212						1	5	3											9
237							3		1										4
262							6												6
287							3												3
312																			
Total						3	23	3	1										30

Table 7

Distribution of C-130B Maneuver Load Factors by Equivalent Airspeed and by Gross Weight Ranges for Altitudes Ranging from 15,000 to 25,000 Feet

75,000 to 130,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112					2		7	4	1										14
137				1	3	6	9	2	1										22
162					1	9	27	15	3	1	1								57
187					4	14	36	17	4			1							76
212					2	17	40	13	5	1									78
237						4	17	4	5	1						1			32
262							20	3	1	2									26
287							2		2										4
312																			
Total				1	12	50	154	58	22	5	1	1				1			309

75,000 to 80,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137																			
162																			
187																			
212							2	1											3
237																			
262																			
287																			
312																			
Total							2	1											3

80,000 to 95,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112							1	2											3
137				2	2	2	2		1										11
162						3	4	3		1	1								12
187					2	3	15	3											23
212						8	21	5	3	1									38
237						1	9	5		1									16
262							4	1		2									[illegible]
287									1										1
312																			
Total				[illegible]	5	20	57	17	8	5	1								121

95,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112					2		5	2	1										10
137						3	6	2											11
162					1	4	23	12	2										42
187					2	10	19	12	4										47
212					2	6	14	7	2										34
237						1	4	1	5							1			12
262							15	2	1										18
287							2		1										3
312																			
Total					7	27	48	38	16							1			177

110,000 to 130,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112							1												1
137																			
162						2			1										3
187						1	2	2				1							6
212							3												3
237							4												4
262							1												1
287																			
312																			
Total						3	11	2	1			1							18

Table 8

Distribution of C-130B Maneuver Load Factors by Equivalent Airspeed
and by Gross Weight Ranges for Altitudes Ranging from 25,000 to 30,000 Feet

80,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112						1													1
137							1	2											3
162							3												3
187					1	3	5	3											12
212						1	9	1											11
237								2											2
262						1													1
287																			
312																			
Total					1	6	18	8											33

80,000 to 95,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112																			
137																			
162																			
187						1													1
212							4	1											5
237																			
262																			
287																			
312																			
Total						1	4	1											6

95,000 to 110,000 lbs.

V_e	LOAD FACTOR n_z (g)																		
(Knots)	0.3	0.4	0.5	0.6	0.7	0.8	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	Total
112						[illegible]													1
137							1	2											3
162							3												3
187					1	2	5	3											11
212						1	5												6
237								2											2
262						1													1
287																			
312																			
Total					1	5	14	[illegible]											27

Aerospace Ground Equipment Engineering Division, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio
SUPPRESSION OF NOISE IN GROUND SUPPORT EQUIPMENT, by Harold D. Swann. March 1961. 45 p. incl. illus. (System Nr. 102-A) (WADD-TN-61-6) Unclassified report.

The purpose of this investigation was to determine a relatively inexpensive, palliative method of reducing the acoustical noise levels of Ground Support Equipment (GSE).

The major problem was found to be the engine exhaust noise emanating from standard Air Force "Packette," air-cooled, internal combustion engines. Of lesser importance

(over)

were such items as generators, air blowers, pumps, and gear trains.

The findings of this effort indicate that the noise level of any Packette engine-driven unit of GSE can be significantly reduced, without causing deleterious effects on power output, by effective muffling and other palliative methods.

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Transmittal of Errata Sheet,
WADD Tech Note 61-44

Transmitted herewith is one copy of the corrected Library Reference card for each copy of WADD Tech Note 61-44 previously transmitted to you or your organization. During the printing operation the Library Reference cards for WADD Tech Note 61-6 were inadvertently inclosed in WADD Tech Note 61-44.

Structures Branch, Flight Dynamics Laboratory, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio. MANEUVER LOAD DATA FROM C-130 AIRCRAFT, by Lawrence Phillips. March 1961. 22p. incl. illus. (Proj. 1367; Task 13637) (WADD TN 61-44) Unclassified report.

This report presents structural flight load data from C-130A and B aircraft performing normal operations and analyses of the data. This information is intended for use in determining design criteria for future flight vehicles and in estimating the effect of these missions on a structure of this type in terms of structural fatigue and estimated life.

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Structures Branch, Flight Dynamics Laboratory, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio. MANEUVER LOAD DATA FROM C-130 AIRCRAFT, by Lawrence Phillips. March 1961. 22p. incl. illus. (Proj. 1367; Task 13637) (WADD TN 61-44) Unclassified report.

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Structures Branch, Flight Dynamics Laboratory, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio. MANEUVER LOAD DATA FROM C-130 AIRCRAFT, by Lawrence Phillips. March 1961. 22p. incl. illus. (Proj. 1367; Task 13637) (WADD TN 61-44) Unclassified report.

This report presents structural flight load data from C-130A and B aircraft performing normal operations and analyses of the data. This information is intended for use in determining design criteria for future flight vehicles and in estimating the effect of these missions on a structure of this type in terms of structural fatigue and estimated life.

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